



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/484,051	01/18/2000	Chan-hoon Park	SEC.0689	9194
7590 07/06/2005				
Jones Volentine LLP Suite 150 12200 Sunrise Valley Drive Reston, VA 20191		EXAMINER CIRIC, LJILJANA V		
		ART UNIT 3753		PAPER NUMBER

DATE MAILED: 07/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/484,051

Applicant(s)

PARK, CHAN-HOON

Examiner

Ljiljana (Lil) V. Ciric

Art Unit

3753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 Dec 2001, 14 Mar 2002, and 3 Sep 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,7,8,13-15,19,20 and 24 is/are pending in the application.
- 4a) Of the above claim(s) none is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,7,8,13-15,19,20 and 24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 January 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 3753

DETAILED ACTION

Response to Amendment

1. This Office action is in response to the replies filed on December 11, 2001, March 14, 2002, and September 3, 2002.
2. Claims 1, 7, 8, 13 through 15, 19, 20, and 24 remain in the application.
3. As previously indicated via the petition decision mailed on October 4, 2002, applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Response to Arguments

4. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Priority

5. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

6. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the drawings filed on January 18, 2000 have already been objected to by the Draftsperson via the Notice of Draftsperson's Patent Drawing Review previously mailed as an attachment to Paper No. 5. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will *not* be held in abeyance.

Claim Rejections - 35 USC § 112

Art Unit: 3753

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claim 24 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. More specifically, claim 24 recites the limitations that "the solid heat transfer medium is heated substantially only by radiant heat derived from the vapor of the fluid heat transfer medium". While this is not new matter since essentially the same set of limitations were cited in claim 6 as originally filed, the originally filed disclosure, including the originally filed specification, fail to provide any written description in support of this set of limitations. The originally filed disclosure fails to provide any explanation of how these method limitations are effected or which particular structure of the corresponding apparatus, for example, ensures that only radiant heat derived from the vapor of the fluid heat transfer medium heats the solid heat transfer medium.

9. Claim 24 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. More particularly, claim 24 recites the limitations that "the solid heat transfer medium is heated substantially only by radiant heat derived from the vapor of the fluid heat transfer medium". Since the originally filed disclosure fails to provide any explanation of how these method limitations are effected or which particular structure of the corresponding apparatus, for example, ensures that only radiant heat derived from the vapor of the fluid heat transfer medium heats the solid heat transfer medium, one skilled in the art at the time of invention would not know how to exclude any convective and conductive heat transfer from occurring between the fluid heat transfer medium and

Art Unit: 3753

the solid heat transfer medium in order to make and use the invention according to claim 24 without undue experimentation.

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 8, 13 through 15, 19, 20, and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

There is insufficient antecedent basis in the claims for the limitations “an enclosed space” [claim 8, line 4], “cavities of said refractory porous body” [claim 13, lines 3-4], and “at least one of respective surfaces of said heat source and said solid heat transfer medium which face toward one another” [claim 15, lines 2-3].

With regard to base claim 8 as written, it is not clear whether the enclosed space cited in line 4 of the claim and the singular groove cited in lines 12 and 13 of the claim refer to the same element or not, thus rendering indefinite the metes and bounds of protection sought by the claims. If both of these terms refer to the same element, then only one term should be used throughout for improved consistency and clarity. If these refer to different elements, then the structural relationship between the enclosed space and the singular groove should be more clearly specified in the claims.

Claim 24 as written appears to be self-contradictory, and thus indefinite with regard to the scope of protection sought thereby. More particularly, claim 24 first recites “so that the wafer is heated with the heat which has been transferred *from the vapor of the fluid transfer medium*, and from the heat source *by conduction, to the solid heat transfer medium*”, then goes on to exclude heat transfer by conduction by reciting “wherein *the solid heat transfer medium is heated substantially only by radiant heat* derived from the vapor of the fluid heat transfer medium.”

Art Unit: 3753

Claims 8, 13 through 15, 19, and 20 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: the one(s) between the enclosed space and the singular groove as recited in base claim 8.

The above is an indicative, but not necessarily an exhaustive, list of 35 U.S.C. 112, second paragraph, problems. Applicant is therefore advised to carefully review all of the claims for additional problems. Correction is required of all of the 35 U.S.C. 112, second paragraph problems, whether or not these were particularly pointed out above.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. As best can be understood in view of the indefiniteness of claims 8 and 19, claims 1, 7, 8, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Shinya et al. (previously of record).

With regard to claims 1 and 7, Shinya et al. [especially Figure 1] discloses a method of heating a substrate or wafer 10 essentially as claimed, including, for example: generating heat using a heat source or heater 5 to be supplied to the wafer or substrate 10; transferring the heat to a liquid component 2 of a fluid heat transfer medium in an amount sufficient to evaporate the liquid 2 and produce a vapor 2a; transferring heat from the vapor 2a of the fluid medium to a solid heat transfer medium 1 wherein vapor 2a is condensed back into a liquid phase 2; supporting the wafer or substrate 10 on the solid heat transfer medium 1 so that the wafer or substrate 10 is heated with the heat which has been transferred from the vapor 2a of the fluid heat transfer medium to the solid heat transfer medium 1; wherein the step of

Art Unit: 3753

transferring heat from the vapor 2a of the fluid heat transfer medium to the solid heat transfer medium 1 comprises directing the fluid heat transfer medium toward the solid heat transfer medium using capillary action (i.e., surface tension, which is inherently a factor in evaporation) at least as broadly interpreted as required; and wherein the step of transferring heat from the vapor 2a of the fluid heat transfer medium to the solid heat transfer medium 1 further comprises circulating the fluid heat transfer medium along at least one closed loop path located adjacent the solid heat transfer medium 1 with the evaporation and condensation occurring within the confines of the solid heat transfer medium being inherently a closed circulatory loop for the fluid heat transfer medium. At least a portion of the heat from the heat source or heater 5 is transferred from the heat source or heater 5 to the solid heat transfer medium 1 via conduction at the interface between the two elements.

With regard to claims 8 and 19, Shinya et al. [especially Figure 2] discloses a wafer or substrate heating apparatus essentially as claimed, including, for example: a heat source or heater 5; a solid heat transfer medium 1 on which the wafer or substrate 10 is to be supported; a fluid heat transfer medium contained in an enclosed space located between the solid heat transfer medium 1 and the heat source or heater 5; the heat source comprising a heater block having an upper surface facing towards a lower surface of the solid heat transfer medium 1, with at least one of the upper surface of the heater block or heater 5 and the lower surface of the solid heat transfer medium 1 defining a singular groove in a closed loop shape in which the fluid heating medium 2 is contained, the enclosed space being delimited by the solid heat transfer medium 1 such that the vapor of the fluid heat transfer medium 2 may contact the solid heat transfer medium 1 directly. Tubular temperature sensor 4 is disposed in the singular groove.

The reference thus reads on the claims.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 3753

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Alternately for claims 8 and 19, and as best can be understood in view of the indefiniteness of the claims, claims 8, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moulene et al.

Moulene et al. [especially Figures 6 and 8] discloses a wafer heating apparatus essentially as claimed, including, for example: resistive heat source 16 and layers 8a and 8b which could be considered as forming a heater block; a solid heat transfer medium 1b on which a wafer or substrate 2 is to be supported; and, a singular groove defined by the upper surface or layer 8a of the heater block in which tube or tubular body 17 is disposed. While Moulene et al. does not show the enclosed space including the fluid heat transfer medium and presumably the singular groove as being disposed between the solid heat transfer medium 1b and the heat source 16, but instead shows the heat source 16 as being disposed between the enclosed space and the solid heat transfer medium, it is hereby noted that merely shifting the relative position of the parts of an apparatus or the rearrangement of parts, absent a corresponding modification of the operation of the apparatus or unexpected results associated therewith, is generally not considered inventive. See *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950). Also, while Moulene et al. does not disclose the tubular body or tube 17 as having internal fins, Official Notice is hereby taken that it is notoriously well-known in the art of heat exchange to place internal fins inside of tubular bodies or tubes carrying a heat transfer fluid.

Thus, it would have been obvious to one skilled in the art at the time of invention to modify the wafer heating apparatus of Moulene et al. by reversing or switching the relative locations of the heat source 16 and the enclosed space in which the fluid heat transfer medium is located such that the enclosed space is sandwiched between the solid heat transfer medium and the heat source in order to make it less likely for overheating to occur of the overheat the solid heat transfer medium and of any wafer disposed

Art Unit: 3753

thereon. It would have been similarly obvious to one skilled in the art at the time of invention to modify the wafer heating apparatus of Moulene et al. by adding internal fins to the tubular body or tube 17 in order to increase the heat transfer rate effected by the heat transfer fluid flowing therethrough.

Allowable Subject Matter

16. As best can be understood in view of the indefiniteness of the claims, claims 13 through 15 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action without any significant broadening and to include all of the limitations of the base claim and any intervening claims.

17. The non-application of art against claim 24 should not be construed as an indication that the claim contains allowable subject matter but rather that the patentability of the claim cannot be determined at this time due to indefiniteness and/or other problems under 35 U.S.C. 112, first and second paragraphs.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ljiljana (Lil) V. Ciric whose telephone number is 571-272-4909. The examiner can normally be reached on Mondays through Fridays from 10:00 a.m. to 6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gene Mancene, can be reached at 571-272-4930.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair->

Application/Control Number: 09/484,051

Page 9

Art Unit: 3753

direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ljiljana (Lil) V. Ciric
Primary Examiner
Art Unit 3753